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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/497,292	02/03/2000	Michael A. Marino JR.	CASPR-004A	7318

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EXAMINER
BURD, KEVIN MICHAEL

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 03/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/497,292	Applicant(s) MARINO, JR.
	Examiner Kevin M. Burd	Art Unit 2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jan 15, 2002*

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *40-64* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideratio

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *40-64* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
18) ☐ Interview Summary (PTO-413) Paper No(s). _____
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

1. This office action, in response to the argument filed 1/15/2002, is a non-final office action.

Response to Arguments

2. The objection to the drawings stated in the previous office actions is maintained and restated below.

3. Applicant's arguments with respect to claims 1-64 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the means to digitize and demodulate the received signals and the converting signals to a corresponding voltage or current must be shown or the features canceled from the claims. No new matter should be entered.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 40-56, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clough et al (US 4,672,674).

Regarding claims 40, 43 and 54-56, Clough discloses a system for suppressing noise signals from a signal containing both voice data and noise signals. The system comprises a first receiver operative to receive both noise and voice data (column 4 lines 12-14). The first receiver digitizes (figure 1 item 5) the voice data and noise signals. A second receiver operative to receive primarily the noise signals (column 4 lines 14-15). The sampled voice data and noise signals are stored in a storage means for storing the samples from both the first and second receivers (column 3 lines 36-37). The receivers are synchronized to one another since the two signals being obtained have the noise components being correlated (column 4 lines 1-5). The definition of synchronization is having events occur at the same time. These noise components are correlated so they occur at the same time. This allows the subtractor 12 and an adaptive filtering means to suppress the noise signals in order to extract the voice data

(figure 1 and column 3 lines 31-45 and 53-57) and to yield an output signal having an enhanced signal to noise ratio (column 7, lines 53-57).

Clough discloses in the abstract, the first receiver is arranged to be close to the mouth of the user and the second receiver will be spaced apart by a distance of one up to ten cms. Clough does not specifically state what the term "close to the mouth of a user for reception of speech" but it is presumed the distance will be roughly one cm. Therefore, the distance between the microphones will be ten times the distance between the first microphone and the user.

Although Clough does not discloses receiving radiated emissions and ambient signals, Clough does disclose receiving a desired signal (the information signal) and an interfering signal (noise signal), receiving a interfering signal (noise signal) and subtracting the signals to recover the desired signal. It would have been obvious for one of ordinary skill in the art at the time of the invention to utilize this method of cancellation in any application that required the elimination of interfering signals to allow for the recovery of the desired signal.

Interference cancellation in Clough and the claimed invention take place at baseband. A demodulator is necessary in the claimed invention to get the received signal down to baseband. In Clough, it is not. The received signal of Clough is already at baseband. It would have been obvious for one of ordinary skill in the art at the time of the invention to use components available to ensure the input signal is a baseband

signal when interference cancellation is to take place so the interference canceler will operate properly. A demodulator is one of those elements.

Regarding claim 41, Clough discloses a system for suppressing noise signals from a signal containing both voice data and noise signals as stated above. Clough further discloses converting the received signals into a corresponding voltage (figure 1 items 5 and 6).

Regarding claim 42, Clough discloses a system for suppressing noise signals from a signal containing both voice data and noise signals as stated above. Clough further discloses converting the received signals into a corresponding voltage (figure 1 items 5 and 6). Clough does not disclose converting the received signals into a corresponding electrical current. However, it would have been obvious for one of ordinary skill in the art at the time of the invention to convert the received signals into a corresponding electrical current. By converting the signals into electrical current, only a minimal loss of signal strength would occur to the signal while traveling along the electrical conducting cable link as compared to a greater loss in voltage form do to the resistance of the wire.

Regarding claims 44 and 45, Clough further discloses the microphones are coupled to the analog to digital converters (A/D) by and electrical conducting means (figure 1).

Regarding claim 46, Clough discloses the two microphones can be arranged in one boom arm (column 3 lines 62-64).

Regarding claims 47-49, 52, 53, 63 and 64, Clough discloses the A/D converters sample the input samples at the same frequency and are therefore synchronized (column 3 lines 14-19). It is inherent that clock signals must be transmitted to each of the A/D converters to maintain this synchronization.

Regarding claim 50, Clough discloses a plurality of microphones can be used to receive the noise signals (column 3 lines 48-52).

Regarding claim 51, Clough discloses a system for suppressing noise signals from a signal containing both voice data and noise signals as stated in paragraph 3. Clough does not disclose the use of a plurality of microphones to receive the voice data and noise signals. However, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a plurality of microphones to receive the voice data and noise signals. With more than one microphone, it is possible to receive a plurality of voice signals from more than one source and after the noise signal has been removed and with proper filtering, all of the voice signals can be recovered.

7. Claims 57-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clough et al (US 4,672,674) in view of the instant applications admitted prior art.

Regarding claims 57-62, Clough discloses a system for suppressing noise signals from a signal containing both voice data and noise signals as stated above. Clough further discloses adaptive filtering is conducted to recover an audible signal (figure 1 and column 3 lines 39-45 and 53-57). However, Clough does not disclose which adaptive algorithm is used. "The two most common classes of adaptive filter algorithms are Stochastic Gradient based algorithms and Least-square based algorithms" page 16 lines 21-23 of the instant application. It would have been obvious for one of ordinary skill in the art to use the most common types of adaptive algorithms in the adaptive filtering conducted by Clough since these types of algorithms are the most widely used.

8. Claims 40-56, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (US 4,912,767).

Regarding claims 40, 41, 43 and 54-56, Chang discloses a system for suppressing noise signals from a signal containing both voice data and noise signals. The system comprises a first receiver operative to receive both noise and voice data (abstract) and a second receiver operative to receive primarily the noise signals (abstract). The first and second receiver are synchronized. Chang states the noise components of the received signals are correlated so they will occur at the same time (column 4, lines 44-50). The noise components will occur at the same time since any

time differences will be compensated for (column 4, lines 51-56). An adaptive filtering means suppresses the noise signals in order to extract the voice data (figure 2 and abstract and column 6 lines 8-15). Chang discloses the noise signals and the voice data /noise signals inputs are received by microphones (column 5 lines 17-29) and the microphones are spaced apart some distance apart.

Although Chang does not discloses receiving radiated emissions and ambient signals, Chang does disclose receiving a desired signal (the information signal) and an interfering signal (noise signal), receiving a interfering signal (noise signal) and subtracting the signals to recover the desired signal. It would have been obvious for one of ordinary skill in the art at the time of the invention to utilize this method of cancellation in any application that required the elimination of interfering signals to allow for the recovery of the desired signal.

Chang does not disclose digitizing the received signals prior to the cancellation step. It would have been obvious for one of ordinary skill in the art at the time of the invention to digitize the received signals. The digitized signals are much easier to store. The stored data will provide a reference and allow the received data to be monitored at a later data to ensure proper reception had occurred.

Interference cancellation in Chang and the claimed invention take place at baseband. A demodulator is necessary in the claimed invention to get the received signal down to baseband. In Chang, it is not. The received signal of Chang is already at

baseband. It would have been obvious for one of ordinary skill in the art at the time of the invention to use components available to ensure the input signal is a baseband signal when interference cancellation is to take place so the interference canceler will operate properly. A demodulator is one of those elements.

Regarding claim 42, Chang further discloses converting the received signals into a corresponding voltage (figure 1 items 5 and 6). Chang does not disclose converting the received signals into a corresponding electrical current. However, it would have been obvious for one of ordinary skill in the art at the time of the invention to convert the received signals into a corresponding electrical current. By converting the signals into electrical current, only a minimal loss of signal strength would occur to the signal while traveling along the electrical conducting cable link as compared to a greater loss in voltage form do to the resistance of the wire.

Regarding claims 44 and 45, Chang further discloses the microphones are coupled to the adaptive filters by and electrical conducting means (figure 2).

Regarding claim 46, Chang discloses the two microphones can be arranged on a pilot's face mask (column 5 lines 17-29).

Regarding claims 47-49, 52, 53, 63 and 64, Chang discloses the receivers are synchronized (column 4 lines 44-56). It is inherent that clock signals must be transmitted to each of the receivers to maintain this synchronization.

Regarding claims 50 and 51, Chang does not disclose the use of a plurality of microphones to receive the voice data and noise signals. However, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a plurality of microphones to receive the voice data and noise signals. With more than one microphone, it is possible to receive a plurality of voice signals from more than one source and after the noise signal has been removed and with proper filtering, all of the voice signals can be recovered.

9. Claims 57-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (US 4,912,767) in view of the instant applications admitted prior art.

Regarding claims 57-62, Chang discloses a system for suppressing noise signals from a signal containing both voice data and noise signals as stated in paragraph 3. Chang further discloses adaptive filtering is conducted to recover an audible signal (figure 2). However, Chang does not disclose which adaptive algorithm is used. "The two most common classes of adaptive filter algorithms are Stochastic Gradient based algorithms and Least-square based algorithms" page 16 lines 21-23 of the instant application. It would have been obvious for one of ordinary skill in the art to use the most common types of adaptive algorithms in the adaptive filtering conducted by Chang since these types of algorithms are the most widely used.

10. Claims 40-53, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mesecher et al (US 6,289,004).

Regarding claims 40, 43-46, Mesecher discloses a system for suppressing interference signals from a desired signal. A first RF receiver receives a signal such that the only large signal received by the auxiliary antenna is the signal from the interferer (column 3, line 65 to column 4, line 2). The main antenna receives the desired signal and a noise component of the interferer. Both antennas are located in the same apparatus as shown in figure 3B. The interferer signal is subtracted from the signal of the main antenna thereby deriving a signal substantially free from the interference source (column 4, lines 25-29). Figure 12 shows the received signal are input to RF receivers. The RF receivers will demodulate the data before inputting the signals to the interference canceler (column 9, lines 61-67). In addition, the received signals are required to be synchronized before subtraction can take place (column 10, lines 8-10). The result of the subtraction is processed and stored in the modem shown in figure 5.

Mesecher does not disclose the received signals are digitized prior to the subtraction taking place. In figure 5, Mesecher shows the subtraction takes place then the signal is converted to a digital signal. The signal must be converted to a digital signal before being input to the modem for processing and for final transmission. It would have been obvious for one of ordinary skill in the art at the time of the invention

to digitize the signal at any point prior to being input to the modem so the signal would be in proper format for the processing and storage in the modem to take place as well as simplifying the circuitry required for the subtraction to take place in the interference canceler.

Regarding claims 41 and 42, Mesecher further discloses converting the received signals into a corresponding voltage (figure 12). Mesecher does not disclose converting the received signals into a corresponding electrical current. However, it would have been obvious for one of ordinary skill in the art at the time of the invention to convert the received signals into a corresponding electrical current. By converting the signals into electrical current, only a minimal loss of signal strength would occur to the signal while traveling along the electrical conducting cable link as compared to a greater loss in voltage form do to the resistance of the wire.

Regarding claims 47-49, 52, 53, 63 and 64, Mesecher discloses the receivers are synchronized (column 10, lines 8-10). It is inherent that clock signals must be transmitted to each of the receivers to maintain this synchronization.

Regarding claims 50 and 51, Mesecher discloses in figure 3B the auxiliary antenna is capable of receiving numerous signals from the interferer to receive the most accurate representation of the interferer signal. The same principle can be used for the main antenna.

11. Claims 57-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mesecher et al (US 6.289.004) in view of the instant applications admitted prior art.

Regarding claims 57-62, Mesecher discloses a system for suppressing noise signals from a signal containing both a desired data signal and noise signals as stated above. Mesecher further discloses adaptive filtering means is conducted to recover the desired data signal (figure 12). However, Mesecher does not disclose how this calculation is computed. "The two most common classes of adaptive filter algorithms are Stochastic Gradient based algorithms and Least-square based algorithms" page 16 lines 21-23 of the instant application. It would have been obvious for one of ordinary skill in the art to use the most common types of adaptive algorithms in the adaptive filtering conducted by Mesecher since these types of algorithms are the most widely used.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Balestri et al (US 5,398,286) discloses a system for eliminating noise components from a received signal by receiving a noise signal and receiving a noise/desired signal.

Contact Information

13. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks
Washington, D.C. 20231

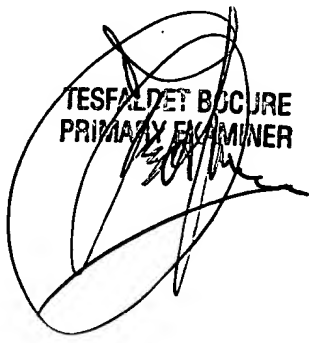
or faxed to:

(703) 872-9314, (for formal communications intended for entry or for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Burd, whose telephone number is (703) 308-7034. The Examiner can normally be reached on Monday-Thursday from 9:00 AM - 5:00 PM. The examiner can also be reached on alternate Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.



Kevin M. Burd
PATENT EXAMINER
March 21, 2002